

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1 1-21 (Canceled).

1 22. (Currently amended) An computer system for solving an interval
2 global optimization problem specified by a function f and a set of equality
3 constraints, the computer system comprising:
4 a processing unit;
5 a memory;
6 an interval arithmetic unit within the processing unit, wherein the interval
7 arithmetic unit is configured to receive floating-point numbers representing a first
8 endpoint and a second endpoint for a first interval and floating-point numbers
9 representing a first endpoint and a second endpoint for a second interval, and is
10 | configured to simultaneously perform arithmetic operations to produce a first
11 endpoint and a second endpoint representing a resulting interval;
12 wherein computational code within the memory is configured to perform
13 an interval global optimization process to compute guaranteed bounds on a
14 globally minimum value of the function $f(\mathbf{x})$ subject to the set of equality
15 constraints;
16 | wherein the interval global optimization process-optimizer is configured
17 to,

18 apply term consistency to the set of equality constraints
19 over a subbox **X**, and to
20 exclude portions of the subbox **X** that can be shown to
21 violate any of the equality constraints.

1 23. (Previously presented) The computer-system of claim 22,
2 wherein the interval arithmetic unit includes a first input, wherein the first
3 input includes a first floating point number representing a lower bound of the first
4 input and a second floating point number representing an upper bound of the first
5 input; and
6 wherein the interval arithmetic unit includes a second input, wherein the
7 second input includes a third floating point number representing a lower bound of
8 the second input and a fourth floating point number representing an upper bound
9 of the second input.

1 24. (Previously presented) The computer-system of claim 22, wherein the
2 optimizer is configured to:
3 precondition the set of equality constraints through multiplication by an
4 approximate inverse matrix **B** to produce a set of preconditioned equality
5 constraints;
6 apply term consistency to the set of preconditioned equality constraints
7 over the subbox **X**; and to
8 exclude portions of the subbox **X** that can be shown to violate any of the
9 preconditioned equality constraints.

1 25. (Previously presented) The computer-system of claim 22, wherein the
2 optimizer is configured to:
3 keep track of a least upper bound f_bar of the function $f(\mathbf{x})$;

1 unconditionally remove from consideration any subbox for which
2 $\inf(f(\mathbf{x})) > f_bar$;
3 apply term consistency to the inequality $f(\mathbf{x}) \leq f_bar$ over the subbox \mathbf{X} ;
4 and to
5 exclude portions of the subbox \mathbf{X} that violate the inequality.

1 26. (Previously presented) The computer-system of claim 22, wherein the
2 optimizer is configured to:
3 apply box consistency to the set of equality constraints $q_i(\mathbf{x}) = 0$ ($i=1, \dots, r$)
4 over the subbox \mathbf{X} ; and to
5 exclude portions of the subbox \mathbf{X} that violate the set of equality
6 constraints.

1 27. (Previously presented) The computer-system of claim 22, wherein the
2 optimizer is configured to:
3 evaluate a first termination condition;
4 wherein the first termination condition is TRUE if a function of the width
5 of the subbox \mathbf{X} is less than a pre-specified value, ϵ_X , and the absolute value of the
6 function, f , over the subbox \mathbf{X} is less than a pre-specified value, ϵ_F ; and to
7 terminate further splitting of the subbox \mathbf{X} if the first termination
8 condition is TRUE

1 28. (Previously presented) The computer-system of claim 22, wherein the
2 optimizer is configured to perform an interval Previously presentedton step on the
3 John conditions.